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Volumes 1, 2, 3, and 4 of Nuclear Science Abstracts were separately indexed by Author, Subject, and Nuclide in Volume 4, No. 24B, Dec. 30, 1950. The Author, Subject, and Nuclide Indexes for Volume 5 of NSA appear in Volume 5, No. 24, Dec. 31, 1951. The cumulative Numerical Index of AEC Reports, described on the following page, is published in Volume 5, No. 24, and includes all reports abstracted in the first five volumes of Nuclear Science Abstracts as well as those abstracted in Abstracts of Declassified Documents.

Each issue of Volume 6 (1952) contains an Author Index and a Report Number supplement to the cumulative Numerical Index of Reports. Subject and Nuclide Indexes, accumulated quarterly, are issued as separate supplements to the sixth, twelfth, and eighteenth issues. The 24th issue will be the Cumulative Index for the year.

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PRICE 25 CENTS

The printing of this publication has been approved by the
Director of the Bureau of the Budget, August 8, 1951.

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NEW NUCLEAR DATA

Summary of New Nuclear Data on Half Lives, Radiations, Relative Isotopic Abundances, Nuclear Moments, Neutron Cross Sections, Reaction Energies, and Masses

Prepared by National Bureau of Standards Nuclear Data Group with the Assistance of Readers

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In this issue, Nuclear Science Abstracts presents its third cumulation of new nuclear data. The material cumulated here is that which has appeared in NSA Vol. 6, Nos. 13 through 18A.

ABBREVIATIONS

a	absorption measurement
$a\beta\gamma$	absorption of β's in coincidence with γ's
ace^-	absorption of conversion electrons
a coin	measurement by placing absorbers between counters in coincidence
α	total γ-ray conversion coefficient, N_e/N_γ
$\alpha_K, \alpha_L, \ldots$	γ-ray conversion coefficient for electrons ejected from the K,L, ... shell
b	coefficient in angular correlation function, $1 + b \cos^2 \theta$
B	band spectra method
$Be\gamma n$	measurement by detection of photoneutrons from Be
Calc	calculated value from experimental work reported elsewhere
cc	cloud chamber
ce^-	conversion electrons
chem	chemical separation of product following reaction
Cpt	Compton electrons
d	(1) deuteron, (2) descendant of, (3) days, when used as superscript
$D\gamma n, D\gamma p$	measurement by detection of photoneutrons or photoprotons from deuterium
$\overline{E}$	average energy
E_θ	resonance energy
$E_\beta, E_\gamma, \ldots$	energy of β ray, energy of γ ray,...
E_{dis}	disintegration energy
EA	electrostatic analyzer
E1,E2,...	electric dipole, electric quadrupole
f	fission, in abbreviations for methods of production or detection
F-K	Fermi-Kurie β energy distribution plot
Γ	resonance half-width (the whole width at half-maximum)
g.s.	ground state
I	(1) spin in units of $h/2\pi$; (2) nuclear induction magnetic resonance method
ic	ionization chamber
J	quantum state of compound nucleus in a nuclear reaction. "I" is used to denote the spin of the target nucleus
K/L	α_K/α_L
M	molecular or atomic beam resonance method
M1,M2,...	magnetic dipole, magnetic quadrupole....
mb	millibarns
Mic	microwave method
mir	measurement by total reflection of neutron beam from mirror surface
ms	mass spectrometer
μ	(1) magnetic moment in units of nuclear magnetons, (2) micron, 10^{-4} cm
μs	microseconds
osc	pile oscillator method
p	(1) proton, (2) predecessor of
para	paramagnetic resonance method
pc	proportional counter
pe^-	photo electrons
ppl	photoplates or emulsions
q	electric quadrupole moment in units of barns
Q	reaction energy in Mev
s	(1) spectrometer method, (2) seconds, when used as superscript
S	atomic-spectra measurement
scin	scintillation counter
sl	lens spectrometer
$sl;ce^-$	conversion electrons measured in lens spectrometer
st	strong
$s\pi$	180° spectrometer
$s\pi\sqrt{2}$	double focusing spectrometer
σ	cross section in barns
σ_0	cross section at resonance energy, E_θ
σ_a	absorption cross section
σ_{el}	elastic scattering cross section
σ_{in}	inelastic scattering cross section
σ_s	scattering cross section
σ_t	total cross section
t	triton, H^3
τ	half life in units indicated
τ_1, τ_2	half life of upper, lower state
th	thermal

w, vw	weak, very weak	$\gamma(\theta,T)$	numbers of γ's as function of angle and temperature
$\beta\gamma,\gamma\gamma$	$\beta\gamma$ or $\gamma\gamma$ coincidences	(0.123)	β and γ energy values enclosed in parentheses are given for identification purposes
$\beta\gamma(\theta)$	angular correlation of β's and γ's in coincidence		
d,p(θ)	angular distribution of protons with respect to deuteron beam		

Standard journal abbreviations are used.
All energies are given in Mev and all cross sections in barns unless otherwise stated in the tabular material.

MAGNETIC MOMENT STANDARDS

In order to have a consistent basis for recording data on magnetic moments, results have been based on the following values and are without diamagnetic corrections.

$\mu(H^1) = 2.7934$ nuclear magnetons
This value has been adopted arbitrarily because it is the one used as a base in the Table of H. L. Poss, The Properties of Atomic Nuclei, I. Spins, Magnetic Moments and Electric Quadrupole Moments. (Revised, BNL-26 (T-10), (unclassified).) The values reported in the New Nuclear Data summaries are thus directly comparable with those listed in the survey of Poss.

$\nu(Na^{23})/\nu(H^1) = 0.26450$	E. Bleuler, M. Gabriel, Helv. Phys. Acta 20, 67(1947).
$\nu(D)/\nu(H^1) = 0.153506$	F. Bloch, E. C. Levinthal, M. E. Pachard, Phys. Rev. 72, 1125 (1947).
$\nu(B^{11})/\nu(H^1) = 0.320827$	D. A. Anderson, Phys. Rev. 76, 434 (1949).

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J. Am. Chem. Soc. 74, Nos. 9-16.
J. chim. phys. 49, Nos. 5,6.
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Proc. Camb. Phil. Soc. 48, No. 3.
Proc. Phys. Soc., (London) A65, Nos. 389,390.
Proc. Roy. Soc. (London) 212A, Nos. 1109-1116.
Physica 18, Nos. 3,4.
Phys. Rev. 85, No. 6; 86, Nos. 1-6.
Z. Naturforsch. 7a, Nos. 1-7.

NEW NUCLEAR DATA

H	σ_t(14.1 Mev) 0.689		H. L. Poss et al., Phys. Rev. 87, 11 (1952); 85, 703A (1952).
$_1H_1^2$	σ_t(14.1 Mev) 0.80		H. L. Poss et al., Phys. Rev. 87, 11 (1952).
$_2He_2^5$	n$\alpha(\theta)$	He^4(n,n)	R. K. Adair, Phys. Rev. 86, 155(1952).
	$p_{3/2} - p_{1/2}$ split by ~5 Mev		
$_2He_4^6$	Level 1.71	Li^7(t,α)	J. T. Dewan et al., Phys. Rev. 86, 416 (1952).
Li	σ_a(th n) 67	osc	J. Ailloud et al., J. phys. radium 13, 171(1952).
$_3Li_2^5$		He^4(p,p)He^4	M. Heusinkveld, G. Freier, Phys. Rev. 85, 80(1952).
	I(ground) = $p_{3/2}$		
	I(2.5 level) = $p_{1/2}$		
$_3Li_2^5$	Resonance E_o 0.400	He^3(d,p)He^4	A. B. Lillie et al., Phys. Rev. 86, 630A (1952).
	p's from Li^6(d,t)Li^5(p)He^4 consistent with Q = 1.8 for Li^5(p)He^4		R. W. Gelinas, S. S. Hanna, Phys. Rev. 86, 253(1952).
$_3Li_3^6$	Level 3.58	Be^9(p,$\alpha\gamma$)	R. B. Day, R. L. Walker, Phys. Rev. 85, 582(1952).
	No other γ	$\alpha\gamma$ scin	
$_3Li_4^7$	Level 4.61	Li^6(d,p)	R. W. Gelinas, S. S. Hanna, Phys. Rev. 86, 253(1952).
		/ Be^9(d,α)	P. Cüer, J. Jung, Compt. rend. 234, 204(1952).
	Li^7(4.65 level) → α + t	ppl	
$_4Be_3^7$	Maximum energy of Li^7 recoils = 56 ev	EA	R. Davis, Jr., Phys. Rev. 86, 976(1952).

$_4Be^8_4$	$Be^9(d,t)$ σ(2.9 level)/σ(ground) = 2.3 E_d = 1.0 ppl	P. Cüer, J. Jung, Compt. rend. 234, 204(1952).
$_5B^{10}_5$	$Be^9(p,\alpha\gamma)Li^6$ Resonance σ_0 Γ(kev) 2.565 0.11 39	R. B. Day, R. L. Walker, Phys. Rev. 85, 582(1952).
$_5B^{11}_6$	d,p(θ) $Be^9(d,p)$ E_d = 1.0 – 2.2	F. L. Canavan, Phys. Rev. 87, 136(1952).
C	σ_t(14.1 Mev) 1.279	H. L. Poss et al., Phys. Rev. 87, 11 (1952); 85, 703A (1952).
	σ_t(400 Mev) 0.288	V. A. Nedzel, J. Marshall, Phys. Rev. 86, 604A(1952).
$_6C^{10}_4$	γ 100% 0.720 scin 2.1% 1.045	R. Sherr, J. Gerhart, Phys. Rev. 86, 619A (1952). B^{10}(p,n)
$_6C^{11}_5$	Levels B^{10}(d,n)C^{11} 1.85 7.39 4.23 8.08 4.77 8.39 6.40 8.62 6.77 ppl	V. R. Johnson, Phys. Rev. 86, 302(1952).
$_6C^{12}_6$	Levels B^{11}(d,n) 9.6 12.76 10.8 15.09 11.1 16.07 11.74 ppl	V. R. Johnson, Phys. Rev. 86, 302(1952).
	p,$\gamma\gamma(\phi)$ B^{11}(p,γ) I(4.4 level) = 2 I(16.4 level) = 2	G. M. Lewis, Phil. Mag. 43, 690(1952).
	Level N^{15}(p,α) 4.432 ± 0.010	A. Schardt et al., Phys. Rev. 86, 527 (1952).
$_6C^{14}_8$	$\bar{E}_\beta/\tau = 2.58 \times 10^{-13}$Mev/sec calorimeter	G. H. Jenks, F. H. Sweeton, Phys. Rev. 86, 803(1952).
	dp(θ) C^{13}(d,p) Results of this and dn(θ) show C^{14}, N^{14} g.s. have same parity	D. A. Bromley, L. M. Goldman, Phys. Rev. 86, 790(1952).
N	σ_t(0.2 – 1.8 Mev) graphs	J. J. Hinchey et al., Phys. Rev. 86, 483 (1952).
	σ_t(14.1 Mev) 1.7	H. L. Poss et al., Phys. Rev. 87, 11 (1952).
$_7N^{14}_7$	dn(θ) C^{13}(d,n) Results of this and dp(θ) show N^{14}, C^{14} g.s. have same parity	D. A. Bromley, L. M. Goldman, Phys. Rev. 86, 790(1952).
	O^{16}(d,α) α's to 2.3 Mev level <2% of α's to g.s.	R. J. Van de Graaff et al., Phys. Rev. 86, 966(1952).
$_7N^{15}_8$	σ_t(0.2 – 1.8 Mev) graphs E_0 Γ(kev) J 0.430 3.5 > ½ 0.492 7.5 0.639 43 ½+ 0.998 46 3/2+ 1.120 19 5/2 1.188 ≤3.2 > ½ 1.211 13 ½– 1.350 22 5/2 1.401 54 3/2– 1.595 22 5/2 1.779 24 5/2	J. J. Hinchey et al., Phys. Rev. 86, 483 (1952).
O	σ_t(14.1 Mev) 1.64	H. L. Poss et al., Phys. Rev. 87, 11 (1952).
$_8O^{16}_8$	γ F^{19}(p,α) 6.13 E3 polarization	A. P. French, J. O. Newton, Phys. Rev. 85, 1041(1952).
	p,$\gamma(\theta)$ F^{19}(p,α) I(6.1 level) = 3– I(6.9 level) = 2+ I(7.1 level) = 2–	J. E. Sanders, Phil. Mag. 43, 630(1952).
	Resonances N^{15}(p,...) p,α p,$\alpha\gamma$ p,γ 0.338 0.429 1.05 1.05 0.898 1.210 1.05 ? 1.210	A. Schardt et al., Phys. Rev. 86, 527 (1952).
$_8O^{17}_9$	I ½ Mic	S. L. Miller et al., Phys. Rev. 86, 607A (1952).
$_9F^{19}_{10}$	F^{19}(p,α)O^{16} Even parity for ground state γ polarization	A. P. French, J. O. Newton, Phys. Rev. 85, 1041(1952).
$_{10}Ne^{19}_9$	τ 18.5" β^+ 2.18 ss No γ with E_γ >0.51 scin	G. Schrank, J. R. Richardson, Phys. Rev. 86, 248(1952); 83, 891A(1951). F(p,n)
$_{11}Na^{21}_{10}$	τ 22.8" β^+ 2.50 ss No γ with E_γ>0.51 scin	G. Schrank, J. R. Richardson, Phys. Rev. 86, 248(1952); 83, 891A(1951). Mg(p,α)
$_{11}Na^{23}_{12}$	Levels Mg^{25}(d,α) 0.43 ppl 2.07	P. M. Endt et al., Phys. Rev. 86, 518 (1952).
$_{12}Mg^{24}_{12}$	Levels Al(p,α) 4.11 4.21 E_p=8	E. M. Reilley et al., Phys. Rev. 86, 857 (1952); 85, 704A (1952).
	Level Mg(p,p) 6.38 a	C. J. Baker et al., Phys. Rev. 85, 1051 (1952).

$_{12}Mg^{24}_{12}$	36 resonances $Na^{23}(p,?\gamma)$ for $E_p = 1.0$ to 2.6	P. H. Stelson et al., Phys. Rev. 86, 629A (1952).
$_{12}Mg^{25}_{13}$	$Mg^{24}(d,p)$ Level / Rel. Intensity 0 / 20 0.58 / 20 0.94 / 15 1.62 / 10 ppl	J. Ambrosen, Nature 169, 408(1952). $E_d = 1.9$
	Levels [$Al^{27}(d,\alpha)$ / $Mg^{24}(d,p)$] 0.583 0.976 2.562 3.405 1.611 2.736 3.898 1.957 2.799 3.969 $E_d = 1.5 - 2.1$ ppl	P. M. Endt et al., Phys. Rev. 87, 27 (1952); 86, 630A (1952).
$_{12}Mg^{26}_{14}$	Levels $Mg^{25}(d,p)$ 1.825 4.92 ppl 2.97 5.27 3.97 5.32 4.35 5.50 4.86 6.15	P. M. Endt et al., Phys. Rev. 86, 518 (1952).
	$Mg^{25}(d,p)$ Level / Rel. Intensity 0 / 1 1.84 / 4 3.00 / 7 4.00 / 10 4.41 / 15 4.91 / 10 ppl	J. Ambrosen, Nature 169, 408(1952). $E_d = 1.9$
$_{12}Mg^{27}_{15}$	Level $Mg^{26}(d,p)$ 0.987 ppl	P. M. Endt et al., Phys. Rev. 86, 518 (1952).
	$Mg^{26}(d,p)$ Level / Rel. Intensity 0 / 35 0.98 / 15 ppl	J. Ambrosen, Nature 169, 408(1952). $E_d = 1.9$
$_{13}Al^{25}_{12}$	Mg(p,p) Levels / J / Γ(kev) 3.11 / $p_{3/2}$ / 1.5 3.75 / f / 0.3 3.88 / $p_{1/2}$ / 36 3.91 / d / 0.1 4.25 / d / 0.15 4.63 / d / 0.3 5.34 / $p_{3/2}$ / 200 5.83 / d ? / - -	L. J. Koester, Phys. Rev. 85, 643(1952). Theoretical interpretation of data of Mooring et al., Phys. Rev. 84, 703 (1951).
$_{13}Al^{27}_{14}$	q 0.155 Calc M with configuration interaction (unshielded)	G. F. Koster, Phys. Rev. 86, 148(1952).
	Capture γ's $Mg^{26}(p,\gamma)$ a coin E_0 / E_γ 0.450 / 6.2 0.813 / 7.2 0.840 / 5.3 0.954 / 7.3 1.015 / 5.5	L. N. Russell et al., Phys. Rev. 86, 819 (1952).
	11 resonances $Mg^{26}(p,\gamma)$ for $E_p = 0.30$ to 1.20	W. E. Taylor et al., Phys. Rev. 86, 630A (1952).
$_{13}Al^{27}_{14}$	Levels Al(p,p) 0.84 4.12 5.22 1.02 4.47 5.34 2.26 4.58 5.50 2.78 4.65 5.56 3.05 4.88 5.62 3.74 5.00 5.74 4.02 5.11 E_p=8	E. M. Reilley et al., Phys. Rev. 86, 857 (1952); 85, 704A (1952).
	Levels Al(p,p) 0.99 3.00 4.39 1.72 3.63 4.66 a 2.22 3.93 5.46	C. J. Baker et al., Phys. Rev. 85, 1051 (1952).
	Levels $Si^{29}(d,\alpha)$ 0.84 sr 1.01 2.21 ? 2.74 ?	D. M. Van Patter, W. W. Buechner, Phys. Rev. 87, 51 (1952).
$_{13}Al^{28}_{15}$	β^- 2.87 sl γ 1.78 sl;pe⁻ β to ground < 2%	H. T. Motz, D. E. Alburger, Phys. Rev. 86, 165(1952); 83, 215A(1951).
Si	Relative abundances ms 28 92.14% 29 4.73% 30 3.13%	J. F. Norton, P. D. Zemany, J. Chem. Phys. 20, 525(1952).
$_{14}Si^{29}_{15}$	Levels $Si^{28}(d,p)$ 1.278 4.840 sr 2.027 4.897 2.426 4.934 3.070 5.946 3.623 6.105 4.078 6.380	D. M. Van Patter, W. W. Buechner, Phys. Rev. 87, 51 (1952).
$_{14}Si^{30}_{16}$	Levels $Si^{29}(d,p)$ 2.24 sr 3.51 3.79	D. M. Van Patter, W. W. Buechner, Phys. Rev. 87, 51 (1952).
$_{14}Si^{31}_{17}$	β^- 1.486 s No γ	A. H. Wapstra, Phys. Rev. 86, 561 (1952).
	Levels $Si^{30}(d,p)$ 0.757 3.140 sr 1.699 3.539 2.319 4.384 2.791	D. M. Van Patter, W. W. Buechner, Phys. Rev. 87, 51 (1952).
$_{15}P^{32}_{17}$	$\bar{E}_{\beta^-}$ 0.70 ± 0.03 ic	R. S. Caswell, Phys. Rev. 86, 82(1952).
	Levels $P^{31}(d,p)$ 0.077 2.18 3.14 ? 0.515 2.22 3.26 1.15 2.65 3.32 1.31 2.74 4.03 1.75 3.00 4.20	D. M. Van Patter, P. M. Endt, Phys. Rev. 86, 502(1952); 86, 630A(1952); MIT Progress Report (Aug. 1951).
$_{16}S^{32}_{16}$	Levels $P^{31}(n,\gamma)$ 20 capture γ's pair s	B. B. Kinsey et al., Phys. Rev. 85, 1012 (1952).
	Levels $P^{31}(d,n)$ 0.6 3.1 5.8 1.3 3.8 6.3 2.1 4.6 2.6 5.2 ppl	S. C. Snowdon, Phys. Rev. 86, 630A(1952).

$_{16}S^{35}_{17}$	μ 0.63 Mic		J. R. Eshbach et al., Phys. Rev. 85, 532 (1952).
	Levels 15 capture γ's	S(n,γ) pair s	B. B. Kinsey et al., Phys. Rev. 85, 1012 (1952).
$_{17}Cl^{35}_{18}$	q −0.0782 Calc M with configuration interaction (unshielded)		G. F. Koster, Phys. Rev. 86, 148(1952).
	$q(Cl^{35})/q(Cl^{37})$ depends on molecule and temp. Mic		T. C. Wang et al., Phys. Rev. 86, 809 (1952).
$_{17}Cl^{36}_{19}$	Levels 12 capture γ's	Cl(n,γ) pair s	B. B. Kinsey et al., Phys. Rev. 85, 1012 (1952).
$_{17}Cl^{37}_{20}$	q −0.0616 Calc M with configuration interaction (unshielded)		G. F. Koster, Phys. Rev. 86, 148(1952).
$_{18}A^{37}_{19}$	Cl^{37}(p,n)		P. H. Stelson, W. M. Preston, Phys. Rev. 86, 807(1952).
	Level Rel. σ	ppl	
	0 0.78		
	1.41 0.22		
$_{18}A^{39}_{21}$	τ 265 ± 30^{y}		H. Zeldes et al., Phys. Rev. 86, 811(1952). Cl(pile n).
$_{19}K^{40}_{21}$	γX,γ(Auger e$^-$) consistent with K/γ = 1		M. Paganelli, G. Quareni, Phys. Rev. 86, 423(1952); Nuovo cimento 9, 324(1952).
	μ −1.2964 M $g_1(K^{40})/g_1(K^{39})$ = −1.24346 ± 0.00024		J. T. Eisinger et al., Phys. Rev. 86, 73 (1952); 85, 716A (1952).
$_{19}K^{40?}_{21}$	Levels 7 capture γ's	K(n,γ) pair s	B. B. Kinsey et al., Phys. Rev. 85, 1012 (1952).
$_{19}K^{42?}_{23}$	Levels 5 capture γ's	K(n,γ) pair s	B. B. Kinsey et al., Phys. Rev. 85, 1012 (1952).
$_{20}Ca^{41?}_{21}$	Levels 7 capture γ's	Ca(n,γ) pair s	B. B. Kinsey et al., Phys. Rev. 85, 1012 (1952).
$_{20}Ca^{45}_{25}$	$\bar{E}_{\beta^-}$ 0.0746 ± 0.003	ic	R. S. Caswell, Phys. Rev. 86, 82(1952).
$_{21}Sc^{46}_{25}$ 20^{S}	γ 0.142 K/L~10	sπ;ce$^-$ ppl	S. B. Burson, W. C. Rutledge, Phys. Rev. 86, 633A(1952).
$_{23}V^{48}_{25}$	γ ~4% 2.22 Crossover γ <0.5%	scin	H. K. Ticho et al., Phys. Rev. 86, 422 (1952). Ti(p,n); chem.
$_{25}Mn^{53}_{28}$	Cr^{53}(p,n)		P. H. Stelson, W.M. Preston, Phys. Rev. 86, 807(1952).
	Level Rel. σ	ppl	
	0 0.35		
	0.37 0.43		
	1.27 0.22		
	Levels Cr^{53}(p,nγ) 0.385 1.27	scin	C. L. McClelland et al., Phys. Rev. 86, 631A(1952).
$_{25}Mn^{54}_{29}$	Cr^{53}(p,n) 271 peaks E_p = 1.42 − 2.47		J. A. Lovington et al., Phys. Rev. 85, 585 (1952); 83, 213A (1951).
$_{25}Mn^{55}_{30}$	Cr^{54}(p,n) 56 peaks E_p = 2.2 − 2.47		J. A. Lovington et al., Phys. Rev. 85, 585 (1952); 83, 213A (1951).
Fe	σ_{el}(1.9 Mev) 1.4 σ_{in}(1.9 Mev) 0.8 assuming isotropy		P. H. Stelson, W. M. Preston, Phys. Rev. 86, 132(1952).
$_{26}Fe^{56}_{30}$	Level Fe(n,n) 0.850	ppl	P. H. Stelson, W. M. Preston, Phys. Rev. 86, 132(1952).
$_{26}Fe^{59}_{33}$	γ 1.11 $\alpha_K = 1.45 \times 10^{-4}$ 1.30 $\alpha_K = 0.84 \times 10^{-4}$ $(0.26\beta^-)/(0.46\beta^-)$ = 48/52	sl;ce$^-$	D. Brower et al., Phys. Rev. 86, 1054(1952).
Co	σ_a(th n) 35	osc	J. Ailloud et al., J. phys. radium 13, 171(1952).
$_{27}Co^{56}_{29}$	γ 0.87 2.04 1.25 2.53 1.73 d 6.4^{d} Ni^{56}	scin	R. K. Sheline, R. W. Stoughton, Phys. Rev. 87, 1(1952).
Ni	Levels 17 values unassigned to isotopes	Ni(p,p) E_p=8	R. Ely, Jr. et al., Phys. Rev. 86, 859 (1952); 85, 704A (1952).
$_{28}Ni^{56}_{28}$	τ 6.4 ± 0.1^{d}		R. K. Sheline, R. W. Stoughton, Phys. Rev. 87, 1(1952). Fe^{54}(39 Mev α,2n); ion chem. *Relative intensities.
	β^+ <1%, α<0.02%		
	γ 100%* 0.17	scin	
	30% 0.28		
	40% 0.48		
	80% 0.81		
	10% 0.96		
	5% 1.33		
	15% 1.58		
	2% 1.75		
	(Co K X-ray)γ, $\gamma\gamma$ p 80^{d} Co^{56}		
	τ 6.0 ± 0.5^{d}		W. J. Worthington, Jr., Phys. Rev. 87, 158(1952). Zn(340 Mev p); ion chem. Fe(α,2n).
	K		
	γ 0.16	scin	
	~0.25 ?		
	0.5		
	0.8		
	>1.4		
	p 80^{d} Co^{56}		
$_{28}Ni^{57}_{29}$	γ 0.114 1.39 1.90	scin	R. K. Sheline, R. W. Stoughton, Phys. Rev. 87, 1(1952). Fe^{54}(39 Mev α, n); ion chem.
$_{28}Ni^{58}_{30}$	$\sigma[Ni^{58}(n,2n)36^{h}Ni]$ Yield for $E_n \simeq 12 - 19$		H. C. Martin, B. C. Diven, Phys. Rev. 86, 565(1952).
$_{28}Ni^{59}_{31}$	Co^{59}(p,n)		P. H. Stelson, W. M. Preston, Phys. Rev. 86, 807(1952).
	Level Rel. σ	ppl	
	0 0.28		
	0.33 0.72		

$_{28}Ni^{60}_{32}$	Levels Ni(p,p) 1.34 E_p=8 1.48 2.50	R. Ely, Jr. et al., Phys. Rev. 86, 859 (1952); 85, 704A (1952).
$_{28}Ni^{61}_{33}$	Zn^{64}(pile n,α)Ni^{61} E_α 6.6 ppl σ~1.5 × 10^{-5}	H. Faraggi, R. Bernas, Compt. rend. 234, 1684(1952).
Cu	σ_t(400 Mev) 1.14	V. A. Nedzel, J. Marshall, Phys. Rev. 86, 604A(1952).
$_{29}Cu^{62}_{33}$	τ 9.8^m	H. C. Martin, B. C. Diven, Phys. Rev. 86, 565(1952). Cu(n,2n)
$_{29}Cu^{63}_{34}$	σ[Cu^{63}(n,2n)9.9^{m}Cu] Yield for E_n~11 – 19	H. C. Martin, B. C. Diven, Phys. Rev. 86, 565(1952).
$_{29}Cu^{64}_{35}$	γ 1.34 sl;ce$^-$ α_K~1.3 × 10^{-4}	D. Brower et al., Phys. Rev. 86, 1054 (1952).
	(1.34γ)/β^+ = 0.023 a	H. T. Vlaar, A. H. W. Aten, Jr., Physica 18, 275 (1952).
$_{30}Zn^{65}_{35}$	β^+ 2.5% γ/X = 0.45, no γβ^+	J. K. Major, Phys. Rev. 86, 631A(1952).
$_{31}Ga^{69}_{38}$	q 0.189 Calc M with configuration interaction (unshielded)	G. F. Koster, Phys. Rev. 86, 148(1952).
$_{31}Ga^{71}_{40}$	q 0.119 Calc M with configuration interaction (unshielded)	G. F. Koster, Phys. Rev. 86, 148(1952).
Ge	σ_a(th n) 2.2 osc	J. Ailloud et al., J. phys. radium 13, 171(1952).
$_{32}Ge^{75}_{43}$	τ 42^s γ 0.15 a α = 2	A. Flammersfeld, Z. Naturforsch. 7a, 295(1952). As(n); Ge(fast and slow n).
$_{32}Ge^{77}_{45}$	β^- 23% 0.710 sl 35% 1.379 42% 2.196 γ 0.042 sl;pe$^-$,ce$^-$ 0.073 0.327 0.466 0.213 0.368 0.564 0.264 0.408 1.105 0.300 0.418 ~1.75 (2.196β)(γ) (0.073γ)(0.264γ) (0.213γ)(0.264γ)	A. B. Smith, Phys. Rev. 86, 98(1952). Ge(d); chem.
$_{34}Se^{77}_{43}$ 17.5^s	τ 17.5^s γ 0.162 sx;ce$^-$ K/L = 4.6 E3 No other γ	W. C. Rutledge et al., Phys. Rev. 86, 775 (1952). Se^{76}(n,γ).
$_{34}Se^{77}_{43}$	μ +0.53326 1 ±0.00005	S. S. Dharmatti, H. E. Weaver, Jr., Phys. Rev. 86, 259(1952).
$_{34}Se^{79}_{45}$ 3.9^m	τ_1 3.5^m γ 0.096 sx;ce$^-$ K/L = 2.9 E3	W. C. Rutledge et al., Phys. Rev. 86, 775 (1952). Se^{78}(n,γ).
$_{34}Se^{81}_{47}$ 59^m	τ_1 58^m γ 0.103 sx;ce$^-$ K/L = 3.0 E3	W. C. Rutledge et al., Phys. Rev. 86, 775 (1952). Se^{80}(n,γ).
$_{34}Se^{81}_{47}$ 17^m	τ_2 17^m β^- 1.5 sx No γ	W. C. Rutledge et al., Phys. Rev. 86, 775 (1952). Se^{80}(n,γ).
$_{34}Se^{83}_{49}$ 67^s	τ_1 69^s No γ	W. C. Rutledge et al., Phys. Rev. 86, 775 (1952). Se^{82}(n,γ).
$_{34}Se^{83}_{49}$ 25^m	τ_2 26^m β^- 1.5 a γ 0.176 scin 0.950 scin	W. C. Rutledge et al., Phys. Rev. 86, 775 (1952). Se^{82}(n,γ).
$_{35}Br^{75}_{40}$	β^+ 19% 0.3 sx 15% 0.6 20% 0.8 46% 1.70	S. C. Fultz, M. L. Pool, Phys. Rev. 86, 347(1952); 86, 631A (1952). Se^{74}(p,γ).
$_{35}Br^{78}_{41}$	τ 17.2^h β^+ 19% 0.6 sx 14% 0.8 11% 1.1 10% 1.7 46% 3.57 γ 0.25 0.68 pe$^-$; 0.33 0.75 ce$^-$ 0.37 0.96 0.42 1.21 No (3.57 β^+)γ	S. C. Fultz, M. L. Pool, Phys. Rev. 86, 347(1952); 86, 631A(1952). Se^{78}(7.3 Mev p,n); chem.
$_{35}Br^{77}_{42}$	τ 58^h γ 0.160 0.299 sx; 0.234 0.521 ce$^-$ Xγ, no β^+γ	S. C. Fultz, M. L. Pool, Phys. Rev. 86, 347(1952); 86, 631A (1952).
$_{35}Br^{79}_{44}$	q(Br^{79})/q(Br^{81}) Mic (000)* 1.199 (010)** 1.197 [J = 5 – 6, BrCN]	S. J. Tetenbaum, Phys. Rev. 86, 440 (1952). *Ground, **first excited vibrational states.
$_{35}Br^{80}_{45}$ 4.4^h	γ (0.049) α≥50 chem	W. H. Hamill, J. A. Young, J. Chem. Phys. 20, 888(1952).
$_{35}Br^{80}_{45}$ 18^m	β_1 85% 2.0 sl β_2 (?) 15% 1.1 No ce$^-$, no $\beta\gamma$	J. Laberrigue-Frolow, Compt. rend. 234, 2599 (1952).
$_{35}Br^{82}_{45}$ 18.5^m	β^- 9% 0.7 sx 11% 1.1 80% 1.97 No (1.97 β^-)γ	S. C. Fultz, M. L. Pool, Phys. Rev. 86, 347(1952); 86, 631A (1952). Se(p), Se(d).
$_{35}Br^{83}_{48}$	β^- 0.94 sx	S. C. Fultz, M. L. Pool, Phys. Rev. 86, 347(1952); 86, 631A (1952). Se(d).

$_{35}Br^{80}_{45}$	γ (0.046) $(\beta e^-)cc$ $\tau<10^{-12}s$		J. Walker, Proc. Phys. Soc. (London) A65, 449 (1952).
$_{36}Kr^{78}_{42}$	τ 34.5^h	ic	P. Radvanyi, Compt. rend. 234, 1275(1952).
$_{36}Kr^{83}_{47}$ 1.9^h	γ_1 0.009	pc	P. T. Burrett, Proc. Phys. Soc. (London) A65, 450 (1952).
	$\alpha\sim10$ $\tau<10^{-7}s$		
	γ_2 0.032	pc	
	K/L + M = 0.32		Se(d); chem.
$_{37}Rb^{82?}_{45}$ short	τ short		S. V. Castner, UCRL-942(1950).
	β^+ 3.15	s$\pi\sqrt{2}$	
	γ ~0.15	s,a	All radiations observed in decay of 25.5^d Sr.
	~0.40	s	
	0.95	a	
$_{37}Rb^{83}_{46}$	γ ~0.15	s	S. V. Castner, UCRL-942(1950).
	~0.45	s	
	0.8	a	d 38^h Sr.
	p 1.9^h Kr		
$_{37}Rb^{84}_{47}$	β^- 1.785	s	J. Moreau, J. Perez y Jorba, Compt. rend. 235, 38(1952).
	$\Delta I = 2$, yes shape		
$_{37}Rb^{87}_{50}$	τ $6.38 \pm 0.3 \times 10^{10}$ y for 27.85%* abundance		M. H. MacGregor, M. L. Wiedenbeck, Phys. Rev. 86, 420 (1952).
	No βe^-		*A. O. Nier, Phys. Rev. 79, 450(1950).
Sr	Resonance	Sr(n,γ)	E. B. Meservey et al., Phys. Rev. 86, 605A (1952).
	E_0 3.5 ev		
$_{38}Sr^{81}_{43}$	τ 29^m		S. V. Castner, UCRL-942(1950).
	p 4.7^h Rb; 13^s Kr		Rb(60 Mev p); chem.
$_{38}Sr^{82?}_{44}$	τ 25.5^d		S. V. Castner, UCRL-942(1950).
	Not p 6.3^h Rb		Rb(40 Mev p); chem.
	For possible γ's see Rb$^{82?}$		
$_{38}Sr^{83}_{45}$	τ 38^h		S. V. Castner, UCRL-942(1950).
	β^+ 1.15	s$\pi\sqrt{2}$	
	γ's 0.040 0.151	ce$^-$	Rb(25 Mev p); chem.
	0.074 0.165		
	0.101		
	p 107^d Rb, 1.9^h Kr		
$_{38}Sr^{85}_{47}$ 70^m	K 14%		A. W. Sunyar et al., Phys. Rev. 86, 1023(1952); 85, 734A(1952).
	γ 84.7% 0.0075	E3	
	α = large		
	0.150		
	84.7% 0.225	M1	
	α_K~0.026		
	K/L~5		
	1.3% 0.233	M4	
	(0.150γ)X	(Rb)	Sr^{84}(pile n).
	No (0.233γ)X		
		sl;ce$^-$,scin	
65^d	K		A. W. Sunyar et al., Phys. Rev. 86, 1023(1952); 85, 734A(1952).
	γ 100% 0.513		
	α = 0.008	M2	
	τ = 0.9$^{\mu s}$		
		sl;ce$^-$,scin	Rb(d); chem.
$_{39}Y^{90}_{51}$	β^- 2.27	s	J. Moreau, J. Perez y Jorba, Compt. rend. 235, 38(1952).
	$\Delta I = 2$, yes shape		
	$\bar{E}_{\beta^-}$ 0.90 ± 0.04	ic	R. S. Caswell, Phys. Rev. 86, 82(1952).
$_{39}Y^{91}_{52}$ 57^d	β^- 1.56	s	J. Moreau, J. Perez y Jorba, Compt. rend. 235, 38(1952).
	$\Delta I = 2$, yes shape		
$_{40}Zr^{91}_{51}$	μ −1.1	S	S. Suwa, Phys. Rev. 86, 247(1952).
$_{40}Zr^{97}_{57}$	τ 17.0^h		C. E. Mandeville et al., Phys. Rev. 86, 631A(1952).
	β^- 2.50	a	
	γ 0.74	a	
	1.42	a coin	Zr^{96}(pile n); chem.
$_{41}Nb^{92}_{51}$	γ 0.933	scin	H. K. Ticho et al., Phys. Rev. 86, 422 (1952).
			Nb^{93}(20 Mev p); chem.
$_{41}Nb^{92?}_{52}$	γ 1.84	scin	H. K. Ticho et al., Phys. Rev. 86, 422 (1952).
	$\tau \gg 10^d$		Nb^{93}(p); chem.
$_{41}Nb^{95}_{54}$	β^- 8% 0.37	sπ	D. R. Jones et al., Phys. Rev. 86, 654A(1952).
	92% 0.69		
	γ 0.455	pe$^-$	Zr^{96}(p,n).
	0.545	pe$^-$	
	0.745	ce$^-$,pe$^-$	
	0.9	pe$^-$	
	1.045	ce$^-$,pe$^-$	
	1.1	ce$^-$	
$_{41}Nb^{97}_{56}$ 76.0^m	τ 72.1^m		C. E. Mandeville et al., Phys. Rev. 86, 813(1952); 86, 631A(1952).
	β^- 1.4	a	
	γ ~0.7	a	Zr^{96}(n,$\gamma\beta$); chem.
	$\beta\gamma$ not function of E_β		
$_{42}Mo^{101}_{59}$	β^- 1.2	sπ	W. C. Rutledge et al., Phys. Rev. 86, 775 (1952). Mo(n,γ).
	2.1		
	γ 0.191	sπ;ce$^-$	
	K/L~6		
	0.960	scin	
$_{43}Tc^{96?}_{53}$	τ 42^m		R. A. House et al., Phys. Rev. 86, 654A(1952).
	K ~50%		
	β^+ ~50% 2.1	a	
	γ 0.2	ce$^-$,a	Mo^{97}, Mo^{98}(6.3 Mev p).
	0.86	a	
	2.8^d activity not confirmed		
$_{43}Tc^{99}_{56}$ 5.9^h	γ 0.0020	sl	H. Schneider et al., Helv. Phys. Acta 25, 259(1952).
	$e^-(0.002\gamma)$ $e^-(0.141\gamma)$		
$_{43}Tc^{99}_{56}$	β^- 0.296	sl	F. Wagner, M. S. Freedman, Phys. Rev. 86, 631A(1952).
$_{43}Tc^{100}_{57}$	τ 15.8^s		G. E. Boyd et al., Phys. Rev. 86, 1051(1952).
	β^- 2.8	a	
	γ		Tc^{99}(th n).
	80^s activity due to F^{47}		

$_{43}Tc^{100}_{57}$	τ 17.5^s β^- 2.4 a γ's 80^s activity not found		R. A. House et al., Phys. Rev. 86, 654A(1952). Mo^{100}(6.3 Mev p).
$_{43}Tc^{101}_{58}$	β^- 1.3 sπ γ 0.307 sπ;ce$^-$ K/L ~ 6 No other γ $(1.3\beta^-)(0.307\gamma)$		W. C. Rutledge et al., Phys. Rev. 86, 775 (1952). Mo(n,$\gamma\beta$).
$_{44}Ru^{103}_{59}$	γ's sπ,ce$^-$ E_γ K/L 0.0396 0.10 0.0529 1.0 0.295 ? 0.498 8 0.611 4		J. M. Cork et al., Phys. Rev. 86, 575 (1952).
	γ 0.4979 s$\pi\sqrt{2}$; ±0.0008 pe$^-$		A. W. Knudsen, Phys. Rev. 86, 571 (1952).
	γ 0.52 scin		V. O. Eriksen et al., Physica 18, 91(1952).
$_{44}Ru^{105}_{61}$	β^- 1.15 sπ γ 0.13 sπ;ce$^-$		C. L. Scoville et al., Phys. Rev. 85, 1046 (1952). Ru(10-Mev d).
$_{45}Rh^{99}_{54}$	τ 4.5^h β^+ 0.74 sπ No γ		C. L. Scoville et al., Phys. Rev. 85, 1046 (1952). Ru(6.3-Mev p).
$_{45}Rh^{101}_{56}$	τ 4.5^d γ 0.15 sπ;ce$^-$ 0.30		C. L. Scoville et al., Phys. Rev. 85, 1046 (1952). Ru(p).
$_{45}Rh^{105}_{60}$ 36^h	β^- 0.57 sπ		C. L. Scoville et al., Phys. Rev. 85, 1046 (1952). Ru(10-Mev d).
$_{45}Rh^{105}_{60}$	β^- 10% 0.26 a$\beta\gamma$ γ 0.080 ? scin vw 0.157 10% 0.322 $(0.26\beta)(0.322\gamma)$		G. E. Boyd, Phys. Rev. 86, 578(1952). Ru(pile n); chem.
$_{45}Rh^{106}_{61}$	$(0.624\gamma)(0.513\gamma)(\theta)$ consistent with I = 0,2,0 $(1.045\gamma)(0.513\gamma)(\theta)$ suggests I(1.55 level) = 2		G. B. Arfken et al., Phys. Rev. 86, 413 (1952).
	$\gamma\gamma(\theta)$ independent of chemical state		R. M. Steffen, Phys. Rev. 86, 632A(1952).
Pd	Resonances Pd(slow n) E_0 12.5, 31 ev		H. H. Landon, V. L. Sailor, Phys. Rev. 86, 605A(1952).
$_{46}Pd^{105}_{59}$	τ 23^s γ 0.23 a α = 0.4		A. Flammersfeld, Z. Naturforsch. 7a, 295(1952). Pd(fast n).
$_{46}Pd^{109}_{63}$?	τ 4.8^m γ 0.19 a α = 0.6		A. Flammersfeld, Z. Naturforsch. 7a, 295(1952). Pd(fast and slow n) Ag(n); chem.
$_{47}Ag^{107}_{60}$ 44^s	No ce$^-$ from 1 to 10 kev sl;e$^-$e$^-$		H. Schneider et al., Helv. Phys. Acta 25, 259(1952).
$_{47}Ag^{109}_{62}$ 39^s	No ce$^-$ from 1 to 10 kev sl;e$^-$e$^-$		H. Schneider et al., Helv. Phys. Acta 25, 259(1952).
Cd	σ_t(400 Mev) 1.70		V. A. Nedzel, J. Marshall, Phys. Rev. 86, 604A(1952).
	Resonances Cd(n,γ) E_0 ~27, ~90 ev		E. B. Meservey et al., Phys. Rev. 86, 605A(1952).
$_{48}Cd^{111}_{63}$	Levels Cd^{111}(n,n) 48^m 0.400 0.720 1.150		J. J. G. McCue et al., Phys. Rev. 86, 632A (1952).
$_{48}Cd^{114}_{66}$	Capture γ Cd^{113}(n,γ) 0.555 (0.555 γ's)/(n's captured) ~0.9		W. A. Thornton, Jr., et al., Phys. Rev. 86, 604A(1952).
$_{48}Cd^{115}_{67}$ 2.33^d	τ 2.25^d β^- 42% 0.58 sπ 58% 1.11 sπ		L. M. Langer et al., Phys. Rev. 86, 632A (1952). Cd^{114}(pile n).
In	σ_t(1 – 30 ev) graphs E_0(ev) Isotope* 1.458 115 1.80 113 3.86 115 4.69 113 9.16 115 12.1 115 14.8 113 22–26 113 23.5 115		V. L. Sailor, L. B. Borst, Phys. Rev. 87, 161(1952). *Enriched materials used.
$_{49}In^{113}_{64}$ 1.7^h	γ (0.390) scin α = 0.55		T. B. Cook, Jr., S. K. Haynes, Phys. Rev. 86, 190(1952).
$_{49}In^{113}_{64}$ stable	q 0.820 Calc M with configuration interaction (unshielded)		G. F. Koster, Phys. Rev. 86, 148(1952).
$_{49}In^{114}_{65}$	β^+/β^- <5 × 10^{-6} 1.27γ/cascade γ's = 0.03 $\gamma\gamma(\theta)$, 1.27γ intensity consistent with I = 2,2,0		M. W. Johns et al., Phys. Rev. 86, 632A (1952); "Errata," p. 581.
$_{49}In^{115}_{66}$ 4.5^h	β^- 5.5% 0.84 sπ γ 0.3337 sπ;ce$^-$ α_K = 0.64, K/L + M = 3.76		L. M. Langer et al., Phys. Rev. 86, 632A (1952).
$_{49}In^{115}_{66}$ stable	μ 5.5109 I		Y. Ting et al., Phys. Rev. 86, 618A(1952).
$_{49}In^{115}_{66}$	q 0.834 Calc M with configuration interaction (unshielded)		G. F. Koster, Phys. Rev. 86, 148(1952).
$_{50}Sn^{124}_{74}$	$\tau_{\beta\beta}$ >10^{17}y		E. L. Fireman, D. Schwarzer, Phys. Rev. 86, 451(1952).

$_{50}Sn^{124}_{74}$	$>0.3 \times 10^{17}$y	R. M. Pearce, E. K. Darby, Phys. Rev. 86, 1049(1952).
$_{51}Sb^{124}_{73}$	γ ~50%* (0.603) $\alpha_K = 0.0042$ E2	F. R. Metzger, Phys. Rev. 86, 435(1952). *% of disintegrations.
	0.60γ no parity change ($\beta\gamma$) polarization	R. Stump, Phys. Rev. 86, 249(1952).
$_{52}Te^{123}_{71}$ stable	τ $>2 \times 10^{14}$y for K x ray	L. I. Rousinow, J. M. Igelnitzsky, Compt. rend. acad. sci. URSS. 49, 343(1945)
$_{52}Te^{133}_{81}$ 63^m	γ 0.3 – 0.4 scin,a α = large	A. C. Pappas, Phys. Rev. 87, 162(1952).
~2^m	τ_2 ~2^m β^- ~70% 1.3 a ~30% 2.4 γ 0.6 a 1.0 d $63^m Te^{133}$	A. C. Pappas, Phys. Rev. 87, 162(1952).
$_{53}I^{131}_{78}$	β_0^- 2.8% 0.25 sl $\beta\gamma$ β_1^- 9.3% 0.34 β_2^- 87.2% 0.61 sl β_3^- 0.7% 0.81 E_γ α_K K/L* γ_1 6.3% 0.080 1.73 7 γ_2 6.3% 0.284 0.047 5 γ_3 80.9% 0.364 0.018 8 γ_4 9.3% 0.637 0.0037 9 γ_5 - 0.163 - - γ_6 2.8% 0.722 0.0028 8 $\beta_2\gamma_1$ delay $<10^{-10}$s $\beta_2\gamma_3$ delay $= 5 \times 10^{-10}$s $\beta_6\gamma_6$, $\beta_1\gamma_4$ 0.90β and 0.97β <0.2%	R. E. Bell et al., Can. J. Phys. 30, 35 (1952); Phys. Rev. 86, 212(1952). *Not K/L + M.
	β^- 13.3% 0.339 s$\pi\sqrt{2}$ 84.7% 0.606 ~1.4% 0.807 γ_2 0.284 E2,M1 γ_3 0.364 E2 γ_4 11.8%* 0.638 E1 γ_6 1.5%* 0.724 E2,M1 α_K** K/L K/L + M γ_2 0.036 5 5 γ_3 0.0174 6.6 4.7 γ_4 0.0021 5.2 γ_6 0.0037	D. Rose et al., Phys. Rev. 86, 863 (1952). *Assuming γ_4/γ_6 = 7.8. **Assuming γ_2/γ_3 = 0.08.
	γ_1 4.3% (0.080) pc,scin, α_K = 1.8 Xγ γ_2 80.7% (0.36) γ_7 0.3% (0.082) from X(0.638γ)	P. E. Cavanagh, Phil. Mag. 43, 648 (1952).
	$\bar{E}_{\beta^-}$ 0.189 ± 0.008 ic	R. S. Caswell, Phys. Rev. 86, 82(1952).
$_{54}Xe^{129}_{75}$ 8^d	γ_2 0.040 sl;Lce$^-$ Crossover not found	S. Thulin, I. Bergström, Phys. Rev. 85, 1055(1952).
$_{54}Xe^{135}_{81}$	σ_a(th n) 3.5×10^6	Office of Classification, AEC, April 7, 1952; Nature 169, 871 (1952).
Cs	Resonance Cs(n,γ) E_0 $\sigma_0\Gamma^2$ 5.70 ev 161	H. H. Landon, V. L. Sailor, Phys. Rev. 86, 605A(1952).
$_{55}Cs^{134}_{79}$ 2.3y	β^- 21% 0.079 s 6% 0.253 54% 0.640 19% 0.676 γ 0.11* 0.561 ce$^-$,pe$^-$ 0.16* 0.567 0.89* 0.601 $\alpha_K = 5.7 \times 10^{-3}$ 1.00* 0.793 $\alpha_K = 2.1 \times 10^{-3}$ vw 1.037 ce$^-$ vw 1.164 vw 1.365	F. H. Schmidt, G. L. Keister, Phys. Rev. 86, 632A(1952) and verbal report. *Relative intensities.
Ba	Resonances Ba(n,γ) E_0 ~25, ~101 ev	E. B. Meservey et al., Phys. Rev. 86, 605A (1952).
$_{58}Ce^{144}_{86}$	β^- 0.31 sπ w 0.45	F. T. Porter, C. S. Cook, Phys. Rev. 85, 733A(1952).
$_{59}Pr^{142}_{83}$	β^- 2.14 s $\Delta I = 2$, yes shape	J. Moreau, J. Perez y Jorba, Compt. rend. 235, 38(1952).
	γ 1.58 sl;pe$^-$ No other γ	E. N. Jensen et al., Phys. Rev. 86, 1047(1952).
$_{59}Pr^{144}_{85}$	β^- ~5% 0.86 sl ~5% 2.3 90% 2.96 γ 1* 0.695 0.4* 1.48 1.1* 2.18 $\gamma\gamma(\theta)$ consistent with I = 1,2,0 or 1,1,0	D. E. Alburger, J. Kraushaar, Phys. Rev. 86, 633A(1952). *Relative intensities.
Nd	σ_a(th n) 43 osc	J. Ailloud et al., J. phys. radium 13, 171(1952).
$_{60}Nd^{147}_{87}$	τ 11.9^d β_1^- 0.384 sπ β_2^- 0.598 β_3^- 0.825 γ 0.091 sπ;ce$^-$ K/L = 4.9 0.301 0.120 0.318 0.197 0.398 0.231 0.441 0.260 0.532 0.273 E2 K/L~6 β_1(0.532γ), β_2(0.318γ), β_3(0.091γ), (0.091γ)(0.441γ)	W. C. Rutledge et al., Phys. Rev. 86, 775 (1952). Nd^{146}(n,γ).

$_{60}Nd^{149}_{89}$	τ 1.8^h β_1^- 0.95 sπ β_2^- 1.1 β_3^- 1.5 γ 0.030 0.210 0.096 K/L~7 E2 K/L = 0.9 0.226 0.112 0.240 0.114 0.266 K/L~5 0.424 0.124 0.538 0.188 0.650 0.198 $\beta_1(0.650\gamma)$, $\beta_2(0.210-0.266\gamma)$, $\gamma\gamma$	W. C. Rutledge et al., Phys. Rev. 86, 775 (1952). $Nd^{148}(n,\gamma)$. γ's by sπ; pe$^-$, ce$^-$; scin.
$_{60}Nd^{151}_{91}$	τ 12^{m*} β^- 1.93 sπ γ 0.085 0.421 sπ; 0.110 0.72 ce$^-$; 0.117 1.14 scin K/L~4 (1.93β)(~0.1γ), (1.93β)(1.14γ)	W. C. Rutledge et al., Phys. Rev. 86, 775 (1952); 85, 734A (1952). $Nd^{150}(n,\gamma)$. Parent of 27.5^{h}Pm. *Formerly assigned to Pm^{151}.
$_{61}Pm^{149}_{88}$	τ 50^h β^- 1.05 sπ γ 0.285 sπ,ce$^-$ K/L~8 M1 1.3 a (1.05β)(0.285γ)	W. C. Rutledge et al., Phys. Rev. 86, 775 (1952). $Nd^{148}(n,\gamma,\beta)$.
$_{61}Pm^{151}_{90}$	τ 28^{h*} β^- 1.1 a γ 0.065 0.177 E2 K/L = 0.3 K/L~9 0.066 0.208 E2 K/L = 0.2 K/L~4 0.070 0.232 E2 K/L = 0.2 0.240 0.100 0.275 K/L~5 0.340 0.116 K/L~9 0.144 0.715 0.163 0.168 sπ; K/L~3 pe$^-$,ce$^-$	W. C. Rutledge et al., Phys. Rev. 86, 775 (1952); 85, 734A (1952). *12^{m}activity previously assigned here now assigned to Nd^{151}, q.v. $Nd^{150}(n,\gamma\beta)$.
$_{62}Sm^{145}_{83}$	K γ 0.061 sπ;ce$^-$ K/L = 1.0 (Pm) No 0.242γ, 0.95γ	W. C. Rutledge et al., Phys. Rev. 86, 775 (1952). $Sm^{144}(n,\gamma)$.
	0.242 and 0.95 γ's due to impurity, probably Eu	R. Katz, M. R. Lee, Phys. Rev. 85, 1038 (1952).
$_{62}Sm^{147}_{85}$	I ½ para	G. S. Bogle, H. E. D. Scovil, Proc. Phys. Soc., (London) A65, 368(1952).
	$\|\mu\|$ 0.7 para $\|q\|$ <0.7	R. J. Elliott, K. W. H. Stevens, Proc. Phys. Soc.,(London) A65, 370(1952).
$_{62}Sm^{147}_{85}$	No e$^-$ ppl	D. C. Dunlavey, G. T. Seaborg, Phys. Rev. 87, 165 (1952).
$_{62}Sm^{149}_{87}$	I ½ para	G. S. Bogle, H. E. D. Scovil, Proc. Phys. Soc., (London) A65, 368(1952).
	$\|\mu\|$ 0.6 para $\|q\|$ <0.7	R. J. Elliott, K. W. H. Stevens, Proc. Phys. Soc., (London) A65, 370 (1952).
$_{62}Sm^{151}_{89}$	τ >20^y No e$^-$	W. C. Rutledge et al., Phys. Rev. 86, 775 (1952). $Sm^{150}(n,\gamma)$.
$_{62}Sm^{153}_{91}$	τ 46^h β^- 0.820 sπ γ 0.070 K/L = 0.29 E2 0.103 K/L = 3.5 0.582 (0.070γ)(0.103γ)	W. C. Rutledge et al., Phys. Rev. 86, 775 (1952). $Sm^{152}(n,\gamma)$. γ's by sπ; pe$^-$, ce$^-$.
$_{62}Sm^{155}_{93}$	τ 23.5^m β^- 1.8 sπ γ 0.105 K/L~4 0.246 (1.8β^-)(0.105γ)(0.246γ)	W. C. Rutledge et al., Phys. Rev. 86, 775 (1952). $Sm^{154}(n,\gamma)$. γ's by sπ; pe$^-$, ce$^-$.
$_{63}Eu^{148}_{85}$	τ 58.6^d K γ 0.69 a	R. C. Mack et al., Phys. Rev. 86, 633A (1952). Sm^{148}(6.8-Mev p,n).
$_{63}Eu^{150}_{87}$	τ 13.1^h β^- 40% 0.8 s 32% 1.0 28% 1.1	R. C. Mack et al., Phys. Rev. 86, 633A (1952) and verbal report. Sm^{150}(6.8-Mev p,n).
$_{63}Eu^{152}_{89}$ 5.3^y	γ 0.121 sπ;ce$^-$ 0.244 0.344 0.990 a	R. Katz, M. R. Lee, Phys. Rev. 85, 1038 (1952).
$_{63}Eu^{152}_{89}$	(0.123γ)(0.344γ) e$^-$e$^-$ (0.121γ)(0.244γ) No (0.244γ)(0.344γ)	C. M. Fowler, R. G. Shreffler, Rev. Sci. Instruments 21, 740 (1950).
$_{63}Eu^{154}_{91}$ 5.4^y	γ 0.122 sπ;ce$^-$ 1.17 a	R. Katz, M. R. Lee, Phys. Rev. 85, 1038 (1952).
$_{63}Eu^{155}_{92}$	τ 1.7^y γ 0.060 sπ;pe$^-$, 0.087 ce$^-$ K/L~8 0.106 K/L~8 0.132	W. C. Rutledge et al., Phys. Rev. 86, 775 (1952). $Sm^{154}(n,\gamma\beta)$.

Gd	Isotope shift	S. Suwa, Phys. Rev. 86, 247(1952).
$_{64}Gd^{150}_{86}$	τ $>10^{4}$y	R. C. Mack et al., Phys. Rev. 86, 633A (1952).
$_{64}Gd^{155}_{91}$	I $\geq$ ½ S $\|\mu\|$ ~0.3 S	S. Suwa, Phys. Rev. 86, 247(1952).
$_{64}Gd^{157}_{93}$	I $\geq$ ½ S $\|\mu\|$ ~0.3 S	S. Suwa, Phys. Rev. 86, 247(1952).
$_{72}Hf^{175}_{103}$	K γ's E_γ K/L(ppl) 0.089 ~3 sπ; 0.113 ~10 ce$^-$ 0.228 ~2 (Lu) 0.318 0.342 4.9 0.431	S. B. Burson, W. C. Rutledge, Phys. Rev. 86, 633A(1952); ANL-4746(1951). $Hf^{174}(n,\gamma)$
$_{72}Hf^{181}_{109}$ 46^d	(0.130γ)(0.471γ) e$^-$e$^-$ (0.130γ)(0.337γ) (0.134γ)(0.337γ) No βe$^-$	C. M. Fowler, R. G. Shreffler, Rev. Sci. Instruments 21, 740 (1950).
$_{73}Ta^{182}_{109}$	τ 111.2 ± 0.5^d	G. G. Eichholz, L. A. Ficko, Phys. Rev. 86, 794(1952). Ta(pile n).
$_{77}Ir^{195}_{118}$?	τ 2.3^h β^- ~1 a Not parent of 18^h Pt^{197}	D. Christian et al., Phys. Rev. 86, 946 (1952). Pt(≤30 Mev γ); chem. Assignment from yield.
$_{77}Ir^{197}_{120}$?	τ 7^m	D. Christian et al., Phys. Rev. 86, 946 (1952). Pt(≤30 Mev γ); chem. Assignment from yield
$_{78}Pt^{195}_{117}$	τ 3.8^d γ_1 90% 0.029 sl;ce$^-$ γ_2 90% 0.097 e$^-$e$^-$ γ_3 10% (0.126) γ_4 100% 0.129 α_K α_L α_M γ_1 ≥6 ≥1.3 γ_2 7.4 1.3 0.3 γ_4 ~∞ K/L = 0.26	A. de-Shalit et al., Helv. Phys. Acta 25, 279(1952). Pt(d), Pt(n); chem. Assignment from Au^{195} γ's, q.v.
$_{78}Pt^{196?}_{117}$	τ ~4^d γ 0.0991 sπ;ce$^-$ 0.1298 (Pt) K/L = 0.1	J. M. Cork et al., Phys. Rev. 86, 415 (1952). Pt(n,γ); chem.
$_{78}Pt^{195*}_{117}$	τ_1 4.4^d e$^-$ 0.12 a	B. C. Haldar, Phys. Rev. 87, 158(1952). Pt(n,γ); chem. *Author assigns to Pt^{193}.
$_{78}Pt^{197}_{119}$? 80^m	τ 88^m ce$^-$	D. Christian et al., Phys. Rev. 86, 946 (1952). Pt(≤70 Mev γ); chem. Not produced by Au(≤70 Mev γ).
$_{78}Pt^{197}_{119}$ 18^h	τ_2 19^h β^- 0.62 a	B. C. Haldar, Phys. Rev. 87, 158(1952). Pt(n,γ); chem.
$_{78}Pt^{197}_{119}$	β^- 1.5% (0.48) sl 98.5% 0.67 γ 100% 0.077 ce$^-$, 1.5% 0.191 pe$^-$ e$^-$(0.191γ) e$^-$(0.077γ)	H. Schneider et al., Helv. Phys. Acta 25, 259(1952).
	γ 0.0774 sπ;ce$^-$ 0.1912 (Au) K/L = 6.0	J. M. Cork et al., Phys. Rev. 86, 415 (1952). Pt(n,γ); chem.
$_{79}Au^{192}_{113}$	τ 4.13^h d 5.7 ^{h}Hg	R. W. Fink, E. O. Wiig, J. Am. Chem. Soc. 74, 2457(1952).
$_{79}Au^{195}_{116}$	γ 35% 0.029 sl;e$^-$e$^-$ 100% 0.097 3.5% 0.126 K/L<1.8	A. de-Shalit et al., Helv. Phys. Acta 25, 279(1952). Pt(d); chem.
	No ce$^-$ from 1 to 10 kev sl;e$^-$e$^-$	H. Schneider et al., Helv. Phys. Acta 25, 259(1952).
$_{79}Au^{198}_{119}$	γ (0.411) E2 α_K = 0.0318* α_L = 0.0103* α_M = 0.0031*	L. Simons, Phys. Rev. 86, 570(1952). *Neglecting β^- branching; assuming K capture ~5%.
	No ce$^-$ from 1 to 10 kev sl;e$^-$e$^-$	H. Schneider et al., Helv. Phys. Acta 25, 259(1952).
$_{79}Au^{199}_{120}$	τ 3.16^d β_1 20% (0.242) sl β_2 73% 0.291 β_3 7% 0.443 γ_1 5% 0.051 ce$^-$, γ_2 78% 0.157 pe$^-$, γ_3 15% 0.208 e$^-$e$^-$ α_K α_L α_M γ_1 ≥1.8 ≥0.5 γ_2 0.33 0.50 0.17 γ_3 0.98 0.17 0.07	A. de-Shalit et al., Helv. Phys. Acta 25, 279(1952). Pt(n,$\gamma\beta$); chem.
	β_1 0.25 s$\beta\gamma$ β_2 0.30 s$\beta\gamma$ β_3 0.46 s (β_1)(0.21γ)delay = 2.4×10^{-9}s (β_2)(0.16γ)delay < 2×10^{-10}s	R. E. Bell et al., Can. J. Phys. 30, 35(1952).
	γ 0.0498 sπ;ce$^-$ 0.1585 (Hg) K/L = 0.56, L/M = 3.6 0.2083 (Hg) K/L = 4.5	J. M. Cork et al., Phys. Rev. 86, 415 (1952). Pt(n,$\gamma\beta$); chem

$_{79}Au^{189}_{110}$	No ce⁻ from 1 to 10 kev	sl;e⁻e⁻	H. Schneider et al., Helv. Phys. Acta 25, 259(1952).
Hg	σ_a(th n) 354	osc	J. Ailloud et al., J. phys. radium 13, 171(1952).
$_{80}Hg^{\leq 191}_{\leq 111}$	τ 2.0^h		R. W. Fink, E. O. Wiig, J. Am. Chem. Soc. 74, 2457(1952). Au(96 Mev p); chem.
$_{80}Hg^{192}_{112}$	τ 5.7^h		R. W. Fink, E. O. Wiig, J. Am. Chem. Soc. 74, 2457(1952). Pt(36 Mev α); chem. Au(60 Mev p); chem.
	β^+ 1.18	a,s	
	ce⁻ 0.18	s	
	γ 1.39	a	
	parent of 4.0^{h}Au		
$_{80}Hg^{193}_{113}$	τ 10^h		R. W. Fink, E. O. Wiig, J. Am. Chem. Soc. 74, 2457(1952). Au(55 Mev p); chem.
	No β^+		
	K x rays		
	parent of 15.8^{h}Au		
$_{80}Hg^{194}_{114}$	Not produced by Pt(36 Mev α) Au(35-to 96-Mev p) 39.5^h Au^{194} not found		R. W. Fink, E. O. Wiig, J. Am. Chem. Soc. 74, 2457(1952); J. H. Moon, A. L. Thompson, Phys. Rev. 83, 892A (1952).
$_{80}Hg^{196}_{116}$	τ 31^h		R. W. Fink, E. O. Wiig, J. Am. Chem. Soc. 74, 2457(1952). Au(30 Mev p); chem.
	No β^+	s	
	K x rays	a	
$_{80}Hg^{197}_{117}$ 25^h	No ce⁻ from 1 to 10 kev	sl;e⁻e⁻	H. Schneider et al., Helv. Phys. Acta 25, 259(1952).
$_{81}Tl^{202}_{121}$	τ 12.5^d		H. C. Martin, B. C. Diven, Phys. Rev. 86, 565(1952). Tl(n,2n)
	γ 0.43	scin	
$_{81}Tl^{203}_{122}$	σ[Tl^{203}(n,2n)12.5^{d}Tl] Yield for $E_n \simeq 12-18$		H. C. Martin, B. C. Diven, Phys. Rev. 86, 565(1952).
$_{81}Tl^{208}_{127}$	e⁻(M) shown to be double $e^-_{L_1}(\gamma_L) + e^-_K(\gamma_M)$		D. A. Silverston, Proc. Phys. Soc., (London) A65, 344 (1952).
Pb	σ_t(400 Mev) 2.69		V. A. Nedzel, J. Marshall, Phys. Rev. 86, 604A (1952).
$_{82}Pb^{209}_{127}$	β^- 0.64	s	A. H. Wapstra, Phys. Rev. 86, 562(1952).
	No γ, no K x ray		
	No e⁻ with $E_{e^-} > 0.030$		
$_{82}Pb^{210}_{128}$	β^- 0.017	pc	A. A. Jaffe, S. G. Cohen, Phys. Rev. 86, 1041(1952).
	≥10% 0.0556		
$_{82}Pb^{210}_{128}$	Energy of >90% of β^- is <5 kev	aβe⁻	J. Teillac et al., J. phys. radium 13, 143(1952).
	γ 7.8 kev	pc	S. G. Cohen, A. A. Jaffe, Phys. Rev. 86, 800(1952). *Relative intensities.
	L x rays		
	α_1 100%* 10.8 kev	pc	
	β_4 13.0 kev		
	γ_1 10%* 15.3 kev		
	No $L_I - L_{II}N$ transitions		
$_{82}Pb^{212}_{130}$	γ(F) (0.238)	s;ce⁻	D. A. Silverston, Proc. Phys. Soc., (London) A65, 344 (1952).
		$L_I/L_{II} = 18$ (Bi)	
		$M_I/M_{II} = 4.3$	
	(0.33β)(0.24γ)delay $<10^{-10}$s		R. E. Bell et al., Can. J. Phys. 30, 35(1952).
$_{83}Bi^{210}_{127}$	τ 5.02 ± 0.02^d		F. Begemann, F. G. Houtermans, Z. Naturforsch. 7a, 143(1952).
$_{83}Bi^{211}_{128}$	γ (0.35)		J. Teillac et al., Compt. rend. 234, 1051 (1952).
		$\alpha_K = 0.18$	
		K/L = 5.5	
	α 82.6% (6.621)	ppl	G. Vieira, L. Salgueiro, Compt. rend. 234, 1765 (1952).
	17.4% 6.274		
$_{83}Bi^{212}_{129}$	$\gamma(H_a)$ 0.2946	s;ce⁻ (Tl)	D. A. Silverston, Proc. Phys. Soc., (London) A65, 344 (1952).
$_{83}Bi^{214}_{131}$	Eγ I Eγ I		S. Kageyama, J. Phys. Soc. Japan 7, 93 (1952). *Value of 47L24 in Nuclear Data should read 0.32 not 3.2.
	0.606 9.0 1.520 0.7	sz;	
	0.766 1.3 1.761 3.2	Cpt	
	0.933 1.1 1.820 0.2*		
	1.120 2.6 2.200 1.0		
	1.238 1.0 2.420 0.5		
	1.379 0.9 2.090?		
$_{84}Po^{210}_{126}$	Pb L x ray/$\alpha = 2.2 \times 10^{-4}$		M. Riou, J. phys. radium 13, 244 (1952).
	Pb K x ray/$\alpha = 1.6 \times 10^{-4}$	crit a	
	$(0.80\gamma)/\alpha = 1.6 \times 10^{-5}$	a	
	Pb L x ray/$\alpha = 2.9 \times 10^{-4}$	pc	W. Rubinson, W. Bernstein, Phys. Rev. 86, 545(1952).
	e⁻ ejection by α's		W. C. Barber, R. H. Helm, Phys. Rev. 86, 275(1952). *Assuming all radiation of ~76 kev to be Pb K x ray.
	Pb K x ray*/0.800γ = 0.13		
	Pb K x ray*/$\alpha = 2.0 \times 10^{-4}$	scin	
	No (0.800γ) X		
	$(0.025 - 2.5\gamma)/(0.800\gamma) < 0.1$		
$_{84}Po^{212}_{128}$	α 10^{6}* 8.805		A. Rytz, Compt. rend. 233, 790(1951). *Relative intensity.
	35* 9.522		
	20* 10.454		
	170* 10.574		
$_{85}At^{211}_{126}$	α 5.85	ic	F. F. Momyer et al., Phys. Rev. 86, 805 (1952).

$_{86}Rn^{209}_{123}$	τ	31^m		F. F. Momyer et al., Phys. Rev. 86, 805 (1952). Th(340 Mev p).
	K ~85%			
	α ~15%	6.02	ic	
$_{86}Rn^{210}_{124}$	τ	2.7^h		F. F. Momyer et al., Phys. Rev. 86, 805 (1952). Th(340 Mev p).
	K ~10%			
	α ~90%	6.02	ic	
$_{86}Rn^{211}_{125}$	τ	16^h		F. F. Momyer et al., Phys. Rev. 86, 805 (1952). Th(340 Mev p).
	K 74%			
	α 26%	5.82	ic	
$_{86}Rn^{212}_{126}$	τ	23^m		F. F. Momyer et al., Phys. Rev. 86, 805 (1952). Th(340 Mev p).
	K <1%			
	α >99%	6.23	ic	
$_{86}Rn^{215}_{129}$	α	8.6	ic	W. W. Meinke et al., Phys. Rev. 85, 429 (1952).
$_{86}Rn^{221}_{135}$	τ	24^m		F. F. Momyer et al., Phys. Rev. 86, 805 (1952). Th(100 Mev p).
	β^- ~75%			
	α ~25%			
$_{87}Fr^{<211}_{<124}$	τ	$<5^m$		F. F. Momyer et al., Phys. Rev. 86, 805 (1952).
	for all isotopes <211			
$_{87}Fr^{211}_{124}$	τ	2 to 5^m		F. F. Momyer et al., Phys. Rev. 86, 805 (1952).
	K/α large			
$_{87}Fr^{212}_{125}$	α	6.36	ic	F. F. Momyer et al., Phys. Rev. 86, 805 (1952).
$_{87}Fr^{213}_{126}$	τ	$<5^m$		F. F. Momyer et al., Phys. Rev. 86, 805 (1952).
$_{88}Ra^{213}_{125}$	τ	$\sim 2^m$		F. F. Momyer et al., Phys. Rev. 86, 805 (1952).
	α			
$_{88}Ra^{219}_{131}$	α	8.0	ic	W. W. Meinke et al., Phys. Rev. 85, 429 (1952).
$_{88}Ra^{224}_{136}$	γ ~0.050		sπ;ce$^-$	S. Rosenblum et al., Compt. rend. 234, 1767(1952).
	0.241			
	$\alpha_K = 0.1$ E2			
$_{88}Ra^{226}_{138}$	α 4.8%	(4.611)	ic	D. G. Karraker et al., Phys. Rev. 83, 390 (1951).
	α 5.5%	(4.611)	ppl	F. Asaro, I. Perlman, UCRL-1725; NSA 6-3108.
	<0.1%	(4.21)		
$_{89}Ac^{222}_{133}$	τ	5.5^s		W. W. Meinke et al., Phys. Rev. 85, 429 (1952).
	d 1.8^m Pa			
$_{90}Th^{223}_{133}$	α	7.55	ic	W. W. Meinke et al., Phys. Rev. 85, 429 (1952).

$_{90}Th^{231}_{141}$	β^- 45%	0.093	sl	M. S. Freedman et al., al., Phys. Rev. 86, 633A(1952); ANL-4613. d 8.8×10^{8y} U^{235}; chem. *Relative intensities (scin).
	11%	0.216		
	44%	0.302		
	γ 1.7*	0.022	sl;ce$^-$	
	0.4*	0.059	scin	
	(sum)	0.063		
	1.0*	0.085		
	0.07*	0.107		
	0.02*	0.122		
	0.02*	0.167		
	0.003*	0.208		
	0.001*	0.230		
$_{90}Th^{232}_{142}$	γ	0.055	ppl;ce$^-$	D. C. Dunlavey, G. T. Seaborg, Phys. Rev. 87, 165 (1952).
	$e^-/\alpha = 24\%$			
$_{90}Th^{233}_{143}$	τ	23.6^m		W. C. Rutledge et al., Phys. Rev. 86, 775 (1952). $Th^{232}(n,\gamma)$.
	β^-	1.23	a	
	No γ, no e^-			
$_{91}Pa^{231}_{140}$	γ's		a,crit a	M. Riou, Compt. rend. 234, 1157 (1952). *Photon intensity per disintegration.
	I_γ*	E_γ	α_L	
	20%	0.012		
	16%	0.015		
		(0.040)	>24	
		(0.066)	>6	
	9%	0.027	<4	
	2.5%	0.100	>4	
	4%	0.300		
		$\alpha_K = 0.9$, K/L = 1.7		
$_{92}U^{227}_{135}$	τ	1.3^m		W. W. Meinke et al., Phys. Rev. 85, 429 (1952).
	α	6.8	ic	
$_{92}U^{232}_{140}$	γ	0.060	ppl;ce$^-$	D. C. Dunlavey, G. T. Seaborg, Phys. Rev. 87, 165 (1952).
	$e^-/\alpha = 30\%$			
$_{92}U^{236}_{144}$	γ	0.050	ppl;ce$^-$	D. C. Dunlavey, G. T. Seaborg, Phys. Rev. 87, 165(1952).
	$e^-/\alpha = 27\%$			
$_{92}U^{238}_{146}$	γ	0.045	ppl;ce$^-$	D. C. Dunlavey, G. T. Seaborg, Phys. Rev. 87, 165 (1952).
	$e^-/\alpha = 22\%$			
$_{93}Np^{237}_{144}$	γ's	≤ 0.065	ppl;ce$^-$	D. C. Dunlavey, G. T. Seaborg, Phys. Rev. 87, 165 (1952).
	$e^-/\alpha = 80\%$			
	$e^-e^-\alpha$, $e^-e^-e^-\alpha$			
$_{94}Pu^{236}_{142}$	γ	0.045	ppl;ce$^-$	D. C. Dunlavey, G. T. Seaborg, Phys. Rev. 87, 165 (1952).
	$e^-/\alpha = 20\%$			
$_{94}Pu^{238}_{144}$	γ	0.040	ppl;ce$^-$	D. C. Dunlavey, G. T. Seaborg, Phys. Rev. 87, 165 (1952).
	$e^-/\alpha = 23\%$			
$_{94}Pu^{239}_{145}$	γ	0.035	ppl;ce$^-$	D. C. Dunlavey, G. T. Seaborg, Phys. Rev. 87, 165 (1952).
		0.050		
	$e^-/\alpha = 12\%$			

$_{94}Pu^{239}_{145}$	$\bar{\sigma}_c$(th n) 361 $\bar{\sigma}_f$(th n) 664 Averages for Maxwellian distribution, kT = 0.025 ev			Office of Classification, AEC, April 7, 1952; Nature 169, 871(1952).
$_{95}Am^{241}_{146}$	α 1.4% 5.379 14% 5.433 84% 5.476 0.21% 5.503 0.34% 5.535 0.23% 5.546		s	F. Asaro et al., Phys. Rev. 87, 277 (1952); 85, 758A (1952).
	γ's ≤0.065 e^-/α = 56% $e^-e^-\alpha$		ppl;ce$^-$	D. C. Dunlavey, G. T. Seaborg, Phys. Rev. 87, 165 (1952).
	γ 7.5%* 0.0263 100%* 0.0597 ~0.5%* 0.075 ? $(0.059\gamma)/\alpha$ = 0.40 $\alpha\gamma$ Np L x rays		pc scin	J. K. Beling et al., Phys. Rev. 86, 797 (1952). Pu^{239}(n,γ; n,$\gamma\beta$). *Relative intensities of photons.
$_{96}Cm^{240}_{144}$	K <0.5% 52^h Am^{240} not found			G. H. Higgins, K. Street, Jr., Phys. Rev. 86, 252(1952). Pu^{239}(~35 Mev α).
$_{96}Cm^{241}_{145}$	τ 35^d K ~100% α~0.25% 5.89		 pc	G. H. Higgins, K. Street, Jr., Phys. Rev. 86, 252(1952). Pu^{239}(~27 Mev α); chem.
$_{96}Cm^{242}_{146}$	α 27% 6.064 73% 6.110		s	F. Asaro et al., Phys. Rev. 87, 277 (1952); 85, 758A (1952).
	γ 0.045 e^-/α = 23%		ppl;ce$^-$	D. C. Dunlavey, G. T. Seaborg, Phys. Rev. 87, 165 (1952).

Q's Between Ground States

$Li^7(t,\alpha)He^6$	+9.79 ± 0.03	J. T. Dewan et al., Phys. Rev. 86, 416(1952).
$Be^9(d,p)Be^{10}$	+4.591 ± 0.008	E. D. Klema, G. C. Phillips, Phys. Rev. 86, 951(1952).
$C^{12}(d,p)C^{13}$	+2.732 ± 0.006	
$O^{16}(d,\alpha)N^{14}$	+3.111	R. J. Van de Graaff et al., Phys. Rev. 86, 966(1952).
$O^{16}(d,p)O^{17}$	+1.918 ± 0.008	E. D. Klema, G. C. Phillips, Phys. Rev. 86, 951(1952).
$Na^{23}(p,n)Mg^{23}$	−4.88 ± 0.01	H. B. Willard et al., Phys. Rev. 86, 259(1952).
$P^{31}(d,n)S^{32}$	+6.3 ± 0.2	S. C. Snowdon, Phys. Rev. 86, 630A(1952).
$Si^{28}(d,p)Si^{29}$	+6.246 ± 0.010	D. M. Van Patter, W. W. Buechner, Phys. Rev. 87, 51(1952); 85, 142(1952).
$Si^{29}(d,\alpha)Al^{27}$	+5.994 ± 0.011	
$Si^{29}(d,p)Si^{30}$	+8.388 ± 0.013	
$Si^{30}(d,p)Si^{31}$	+4.364 ± 0.007	
$Cr^{53}(p,n)Mn^{53}$	−1.380 ± 0.008	J. A. Lovington et al., Phys. Rev. 85, 585.
$Cr^{54}(p,n)Mn^{54}$	−2.162 ± 0.005	J. A. Lovington et al., Phys. Rev. 85, 585.

Packing Fraction Differences, Δf, in Units 10^{-4} amu

Doublet	Δf	Reference
$Si^{28}-CO$	−7.6 ± 0.2	J. F. Norton, P. D. Zemany, J. Chem. Phys. 20, 525(1952).
$Si^{28}-N_2$	−10.5 ± 0.1	
$Si^{28}-C_2H_4$	−21.3 ± 0.1	
$Ti^{46}-CH_2S$	−7.696 ± 0.009	T. L. Collins et al., Phys. Rev. 86, 408(1952).
$Ti^{47}-CH_2S$	−9.32 ± 0.02	
$Ti^{48}-C_4$	−10.88 ± 0.01	
$Ti^{49}-C_4H$	−12.23 ± 0.01	
$Ti^{50}-C_4H_2$	−14.178 ± 0.006	
$V^{51}-C_4H_3$	−15.54 ± 0.01	
$Cr^{50}-C_4H_2$	−13.91 ± 0.01	
$Cr^{52}-C_4H_4$	−17.48 ± 0.02	
$Cr^{53}-C_4H_5$	−18.56 ± 0.02	
$Cr^{54}-C_4H_6$	−19.85 ± 0.04	
$Mn^{55}-C_4H_7$	−21.20 ± 0.02	
$Fe^{54}-C_4H_6$	−19.85 ± 0.01	
$Fe^{56}-C_4H_8$	−22.82 ± 0.02	
$Fe^{57}-C_4H_9$	−23.70 ± 0.02	
$Fe^{58}-C_4H_{10}$	−24.96 ± 0.07	
$Fe^{58}-Th^{232}$	−13.17 ± 0.05	G. S. Stanford et al., Phys. Rev. 85, 1039(1952).
$Ni^{58}-C_4H_{10}$	−24.72 ± 0.02	
$Ni^{60}-C_5$	−11.70 ± 0.05	
$Ni^{61}-C_5H$	−12.83 ± 0.04	
$Ni^{62}-C_5H_2$	−14.30 ± 0.01	
$Ni^{64}-SO_2$	−5.42 ± 0.01	
$Co^{59}-Sn^{118}$	− 2.99 ± 0.02	
$Cu^{63}-C_5H_3$	−14.982 ± 0.008	
$Cu^{65}-C_5H_5$	−17.168 ± 0.008	
$Zn^{64}-SO_2$	−5.106 ± 0.003	T. L. Collins et al., Phys. Rev. 86, 408(1952).
$Zn^{64}-O_2$	−7.889 ± 0.007	
$Zn^{66}-C_5H_4$	−18.314 ± 0.008	
$Zn^{67}-C_5H_7$	−19.116 ± 0.008	
$Zn^{68}-C_5H_8$	−20.222 ± 0.009	
$Zn^{70}-C_5H_{10}$	−21.840 ± 0.007	
$Pd^{104}-Pb^{208}$	− 8.06 ± 0.02	
$Sn^{116}-Th^{232}$	−10.06 ± 0.03	
$Sn^{117}-U^{234}$	−10.01 ± 0.03	
$Sn^{118}-Co^{59}$	+ 2.99 ± 0.02	
$Sn^{119}-U^{238}$	−10.19 ± 0.03	
$Ba^{138}-Pb^{207}$	− 5.62 ± 0.05	
$Pb^{207}-Ba^{138}$	+ 5.62 ± 0.05	
$Pb^{208}-Pd^{104}$	+ 8.06 ± 0.02	
$Th^{232}-Fe^{58}$	13.17 ± 0.05	
$Th^{232}-Sn^{116}$	+10.06 ± 0.03	
$U^{234}-Sn^{117}$	+10.01 ± 0.03	
$U^{238}-Sn^{119}$	+10.19 ± 0.03	

Mass Values--Time of Flight Measurements

Atom	Mass	Reference
S^{32}	31.983 ± 0.001	E. E. Hays et al., Phys. Rev. 84, 824(1951); 85, 1065(1952).
Cl^{35}	34.9805 ± 0.0005	
K^{41}	40.975 ± 0.002	
Br^{79}	78.944 ± 0.001	
Br^{81}	80.943 ± 0.001	
Kr^{84}	83.938 ± 0.001	
Rb^{85}	84.931 ± 0.002	
Rb^{87}	86.930 ± 0.002	
I^{127}	126.946 ± 0.001	
Xe^{129}	128.946 ± 0.002	
Xe^{130}	129.945 ± 0.002	
Xe^{131}	130.944 ± 0.002	
Xe^{132}	131.945 ± 0.002	
Xe^{134}	133.947 ± 0.002	

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